

# Intelligent Design and Analysis of E-Governance Conceptual Model for Effective Implementation in Specific Reference to Nepal

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**Abstract:** The term "e-Governance," also known as "electronic governance" or "e-government," refers to the use of information technology to facilitate administrative support, exchange of information, communication processes, the establishment of numerous complete systems between the government and its people, businesses, different governments, and employees, and operational actions and reciprocal action within the overall authoritarian model. Administrative support is made easily, effectively, and transparently available to people through e-governance. E-government is essential to any country's growth. Nepal is a nation in development. Geographically, politically, socially, culturally, and technologically, Nepal faces several difficulties. The concerns must be addressed when talking about e-Governance in Nepal. This research focuses on the numerous elements and factors that contribute to its implementation's success. This research offers a conceptual framework for the effective application of e-Government in Nepal in addition to discussing the issues, challenges, barriers and Intelligent Design and Analysis of E-Governance Conceptual Model for Effective Implementation in Specific Reference to Nepal.

**Keywords:** Barriers, EGDI, e-governance, E-Governance Master Plan, Factors, Information Technology, SAARC.

## 1. Introduction

The primary objective of incorporating computerized governance into it is to improve and increase the effectiveness of management in various ways. Electronic government can help Actin in several ways, such as by streamlining information submission, written request processes/reclamations between businesses and private citizens, and engagement with regional authorities, whether the objective is to cut costs by lowering the amount of paper needed, the cost of employment, or interacting with the public or local government. Although the extent and degree of involvement of municipal administration vary from one municipality to another, there are some benefits to the development of information technology in administration from both an internal and exterior viewpoint. There are presently four major phases of electronic government in municipal government:

- Digital government;
- Coordinated and secured contact between governmental organizations;
- Internet-based assistance;
- Internet trade for more effective transaction administration;

### 1.1. Basic Concept and Theories / Models of e-Governance

Electronic governance, also known as e-Governance, is the use of information technology to deliver government services, information exchange, communication transactions, integration of different stand-alone systems between government to citizen (G2C), government to business (G2B), government to business (G2B), government to government (G2G), and government to employee (G2E), as well as back-office processes and interactions within the overall governance framework. Government services are made accessible to people through information technology through e-governance. In terms of governance ideas, the three major target groups that can be identified are the company, government, and community groups. It is anticipated that this will strengthen the bond between public servants and the communities they serve, resulting in a government that is more robust, accountable, and inclusive [1].

E-governance in Nepal has constantly advanced from the computerization of government agencies to programs that emphasize the best qualities of transparent, customer-focused government. The country's progressive e-governance approach has been greatly influenced by the lessons learned from previous e-governance efforts.

### 1.2. Information and Communication Technology

The twentieth century saw significant advancements in science and technology. Ironically, three billion people live in extreme poverty, 850 million people lack a high school diploma, more than 150 million children are compelled to

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labor, and 125 million do not attend school. Only South Asia is responsible for most of the figures, and Nepal's percentage is significant. The figures highlight the need for a coordinated effort to increase the region's poor population's income and physical well-being, which is currently feasible by implementing effective e-Government. This will significantly improve the situation of the populace and transform their lives for the better. In 1971, Nepal's adventure with ICT (Information and Communication Technology) began with the use of a computer to handle census data [3]. The private sector's efforts are mainly responsible for the sector's ongoing development. Recent developments in ICT are giving nations like Nepal unheard-of chances to improve their education, health, agriculture, tourism, commerce, and numerous other areas. This has given the country the ability to surmount its geographic and fiscal obstacles. The goal of the IT Policy 2000, "to put Nepal on the global map of information technology within the next five years," demonstrates how well the government has anticipated the advantages. In the industrial and other industries, computerization varies from 100% in global corporations to 10% in state-run businesses. ICT is becoming more widely known, particularly in metropolitan regions. A sizable human resource of various norms and backgrounds is also being created. However, the spread of ICT in Nepal is still uneven and only occurs in a few metropolitan regions. Most of the populace faces significant connectivity expenses, and the necessary infrastructure is lacking.

However, the government has attempted to act as an enabler recently with the creation of the High-Level Commission for Information Technology (HLCIT). A few positive events include the Electronic Transaction Act (ETA), the planned amendment to the ICT Policy 2000, the creation of IT Parks, etc. Additionally, the Apex authority has taken the initiative to use ICT to strengthen the government, which is correct. The worldwide explosion of information presents both chances and difficulties for developing nations like Nepal. For instance, less developed nations can take and modify knowledge that is offered for free or at a very cheap cost. Knowledge transmission is more affordable than ever thanks to the decline in connectivity costs. Therefore, developing

nations now have a rare chance to take advantage of the immense resources of international information networks to advance their wealth and success and bridge centuries-old knowledge gaps. However, emerging nations can only benefit from the vast repository of global knowledge if they acquire the technical know-how to seize it.

### 1.3. Historical background of e-Governance in Nepal

In 1972 the debut of the survey machine (IBM 1401). Electronic Data Processing Center was established in 1974. Data System International Pvt. Ltd., a business established for export, made the first private overseas investment in software creation in 1982. Personal computers were first distributed in 1985, equipment import restrictions were liberalized in 1990, the Computer Association of Nepal was founded in 1992, the Ministry of Science and Technology was established in 1996, the first IT policy, "IT Policy 2000," was announced in 2000, the National Information Technology Center was established in 2001, the High-Level Commission for Information Technology was established in 2003, the Telecommunication Policy was adopted in 2004, and the Electoral Reform Act was enacted in 2007 [5-8]. The Government Integrated Data Center was established in 2008. The National Standard Code for Information Interchange was published in 2009. The IT Policy was promulgated in 2010. The IT Policy was promulgated in 2015. The IT Act was promulgated in 2074 BS (Draft Bill) [2-4].

## 2. Problem Statement

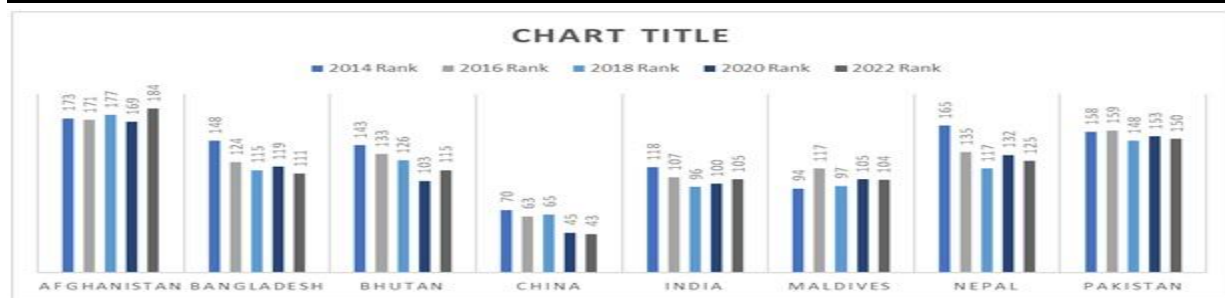
With an electronic governance maturity score of just 0.3458, compared to Bangladesh's 0.3799 and Bhutan's 0.3506, respectively, Nepal's e-government is imprisoning in comparison to its smaller peers, such as Bhutan and Bangladesh (United Nations Department of Economic and Social Affairs, 2016). The major obstacles to implementing computerized administration are political unrest and a lack of political will on a national level. Even though Nepal's EDGI rating increased in 2018, it significantly declined in 2020 and 2022. Table 1 shows the EDGI rankings of SAARC countries, including China, broken down by year. Figure 1 displays a bar graph for the EDGI rating increase for SAARC countries, including China [9].

**Table 1:** E-Government Development Index (SAARC Nation including China)

Source: <https://publicadministration.un.org/egovkb/en-us/Data-Center> [9]

2014		2016		2018		2020		2022	
Rank	EDGI	Rank	EDGI	Rank	EDGI	Rank	EDGI	Rank	EDGI

Afghanistan	173	0.19	171	0.2313	177	0.2585	169	0.3203	184	0.271
Bangladesh	148	0.2757	124	0.38	115	0.4862	119	0.5189	111	0.563
Bhutan	143	0.2829	133	0.3507	126	0.4274	103	0.5777	115	0.5521
China	70	0.545	63	0.6071	65	0.6811	45	0.7948	43	0.8119
India	118	0.3834	107	0.4638	96	0.5669	100	0.5964	105	0.5883
Maldives	94	0.4813	117	0.433	97	0.5615	105	0.574	104	0.5885
Nepal	165	0.2344	135	0.3458	117	0.4748	132	0.4699	125	0.5117
Pakistan	158	0.258	159	0.2583	148	0.3566	153	0.4183	150	0.4238



**Fig. 1.** Bar chart of EDGI rank of Nepal including SAARC and China

Source: <https://publicadministration.un.org/egovkb/en-us/Data-Center> [9].

### 3. RESEARCH OBJECTIVES

As was previously mentioned, Nepal's e-Governance status demonstrates that the country's development or UN rating relative to other emerging / SAARC nations is uncertain. This volatility is a result of numerous unrecognized or unaddressed problems. This research will cover these aspects, along with a framework for execution. The EGDI (e-governance developing index) demonstrates that Nepal's rating is not excellent and that it varies frequently up and down, so there is a need for research on the following issues:

- To evaluate the current state of e-government applications in Nepal.
- To investigate the factors affecting Nepal's e-governance.
- To evaluate the risks, challenges, and problems affecting Nepal's e-governance.
- To create a computational system for the application of e-government with an emphasis on Nepal.

In his 2004 defense of the necessity of looking into Internet governance services, Ndou summed up the options as follows:

- Advantages of efficiency and efficacy
- Gains for business and consumers in terms of quality; accountability, openness, and anti-corruption;
- Development of communities and networks;

- Enhancement of decision-making quality;
- improvement of administrative performance; and promotion of ICT use in other societal sectors are all included.

A study of the literature revealed three different stages of initiatory execution for electronic administration that go beyond component recognition. These actions are essential because they enable regulators to identify parties' roles and responsibilities. As follows:

- Execution is the phase after pre-execution, which is the design phase.
- The Deployment Phase Following Execution.
- Typically, the program begins in the pre-execution phase and continues through the post-execution phase, which comes after the execution phase.

### 4. Literature Work

E-governance is the use of technology to handle governmental operations online and give people simple access to governmental services [6-8]. Following the global ICT growth, the word "e-governance" gained currency, and many governments adopted it as a tool to streamline their operations [6] [10]. It is a socio-technical structure dependent on individuals, processes, Technology and tools for The Fifth International Academic Conference for Graduates, NUAA 19–20 October 2017, and Nanjing, China [6]. Although it is defined differently by various authors, the fundamental

concept is the same [6]: to create functional work systems and enhance operations. The use of information and communication technology in government operations and procedures to achieve "simple, moral, accountable, responsive, and transparent" (SMART) administration is known as e-governance or "electronic governance" [11-12]. It is a quickly expanding issue that affects the operations of governmental and nonprofit organizations more and more. Various scholars have carried out numerous studies on e-governance that relate to effectiveness, security, dependability, compatibility, and other related aspects over time. While certain researchers explained it as models based on exchanging and providing amenities for people and companies and work for the goals of reducing misconduct, strengthening accountability, decreasing time, and cost, and increasing transparency [14-15], other scholars defined E-Government systems as information systems that depend on social and technical aspects. By offering end users access to information about government apparatus, instantaneous reaction, and efficient working processes, Mukherjee and Sahoo claim that e-Government can streamline the working process of the government [13]. It is a phrase frequently used today to enhance organizational effectiveness, citizen involvement, and government operations [12]. It offers a means of enhancing government work and facilitates the exchange of information with stakeholders, including citizens. With the creation of the e-governance master plan, which was commissioned by HLCIT, NITC, MoEST, MoIC, MoGA, and MoF in 2006 [13-17], e-governance in Nepal gained significant importance. Effective implementation of e-governance must take into consideration several variables that are crucial to the system's deployment as well as to the identification of its essential needs and supporting elements [18]. Since then, many academics have researched various aspects of e-

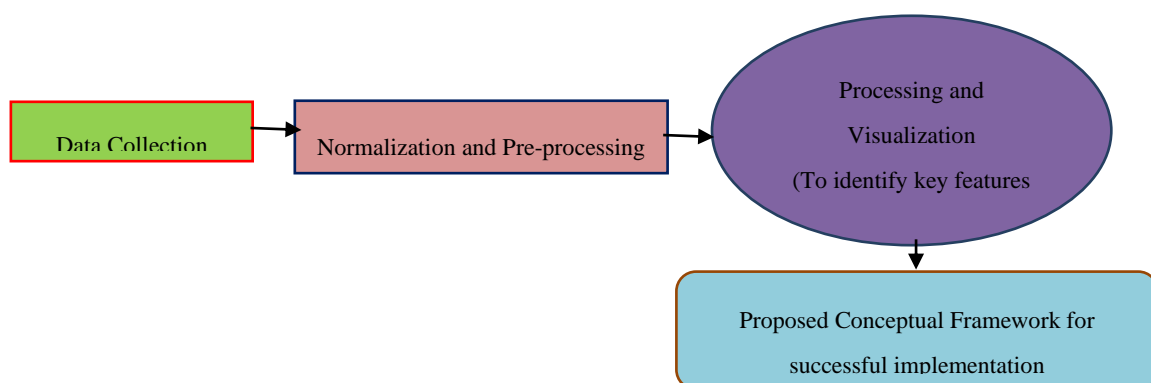
governance in Nepal, spanning a range of topics. Shakya and Kharel expanded on the current state of e-governance in Nepal in comparison to South East Asia and talked about the difficulties in implementing it [4] [17]. Dhami researched the stages of e-governance application in Nepal and talked about the opportunities and difficulties that might arise [2]. Ghimire spoke about the importance of e-governance in the provision of services in the setting of Nepal [12]. He spoke about the government's ongoing initiatives and emphasized the goal of e-governance in Nepal. Like this, Bhattarai discusses various e-government action plans and the status of e-governance in Nepal today [6].

## 5. Dataset Description

The research looks at the variables that influence how effectively e-Government is implemented at the local level in Nepal's Banke District. This research aims to comprehend how to adopt e-government at the local government level in Nepal and identify the major advantages, disadvantages, risks, and other aspects of doing so. In this research, there are 14 dependent characteristics and 8 independent attributes. To further analyze this study, six internal and five external variables are used.

## 6. Proposed Methodology

The first stage of the suggested analysis approach is data collection from local administrative organizations. The second step involves normalizing and filtering the data using various pre-processing methods. Step three involves identifying the many characteristic. The fourth stage is the creation of a correlation matrix. The creation of a conceptual framework and Python-based data visualization follows.



**Fig. 2.** Stages in Data Analysis

The research has been created using data from various people with administrative duties, educational in nature, agricultural, medical, and other government organizations of Nepal. We use Python tools like Numpy [19], Seaborn [20], Matplotlib with Pyplot [21], and

Pandas [22] to aid in the visualization of the data. These tools help to visualize the data in different charts and diagrams so that it is easier to understand. Not a single number (nan) from the collection, but regression is used to assess data complexity. Numerous studies on

professions, gender, age, education, and other factors show that schooling is insufficient and that elderly

people are less able to adapt to change.

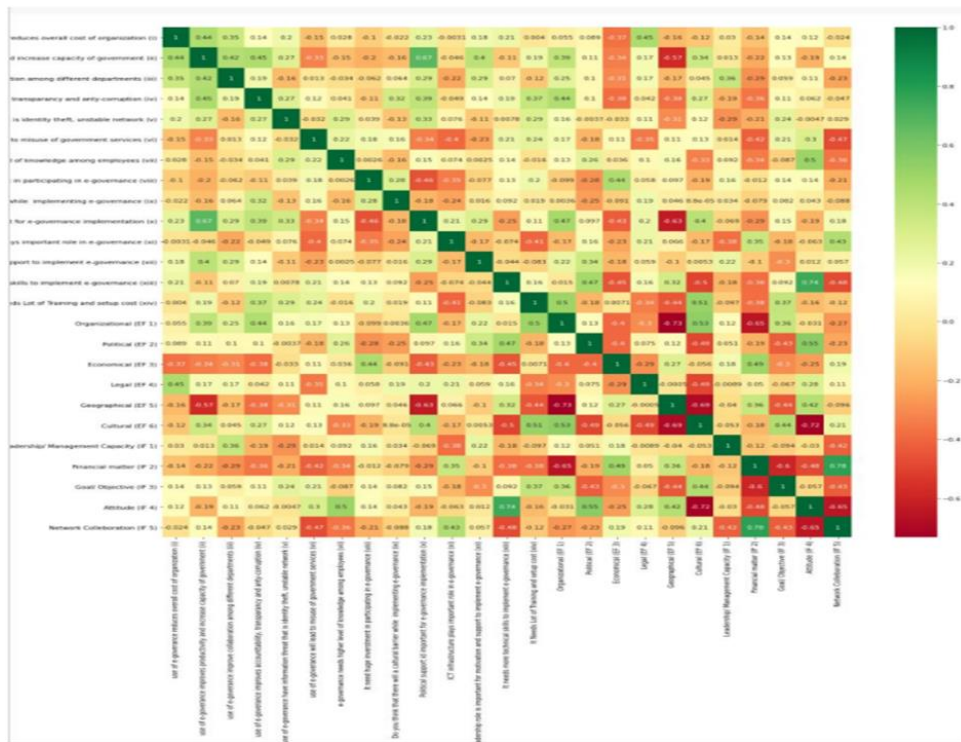


Fig. 3. Heat Map Analysis

Key Findings from the data Visualization based on agree, disagree, neither agree nor disagree and strongly agree are as follows:

**Disagree:** The use of e-governance will result in the abuse of government services; do you anticipate a societal barrier during the implementation of e-governance?

**Neither Agree nor Disagree:** The use of e-governance lowers an organization’s total cost. Leadership is crucial for fostering the implementation of e-governance and for

providing the necessary incentive and support.

**Agree:** The use of e-governance increases government capacity and efficiency, enhances departmental cooperation, and calls for more knowledge among staff members. Implementing e-governance requires political backing.

**Strongly Agree:** The use of e-governance enhances accountability, openness, and anti-corruption; however, it requires significant expenditure, and ICT infrastructure plays a key role in e-governance.

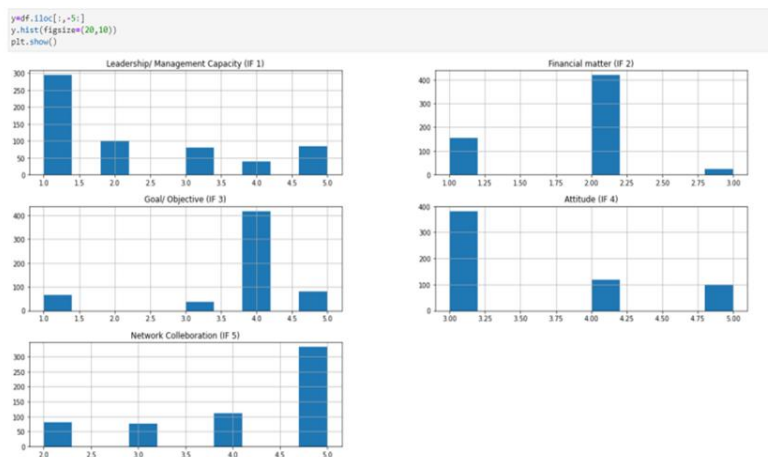
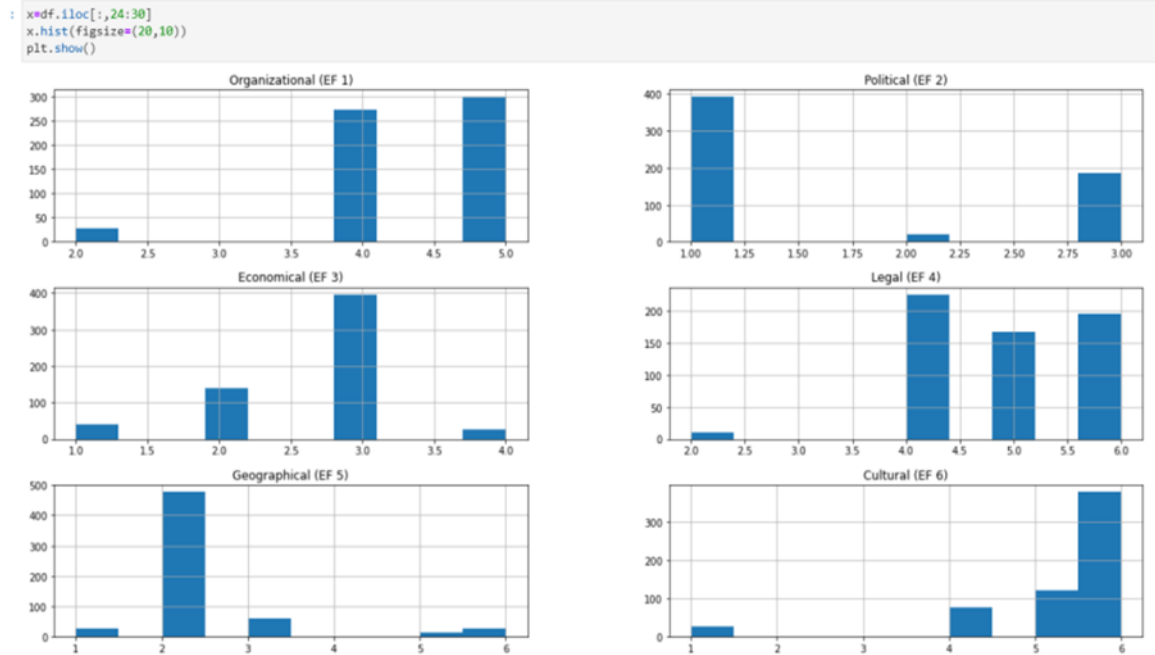


Fig. 4. External Factor Visualization

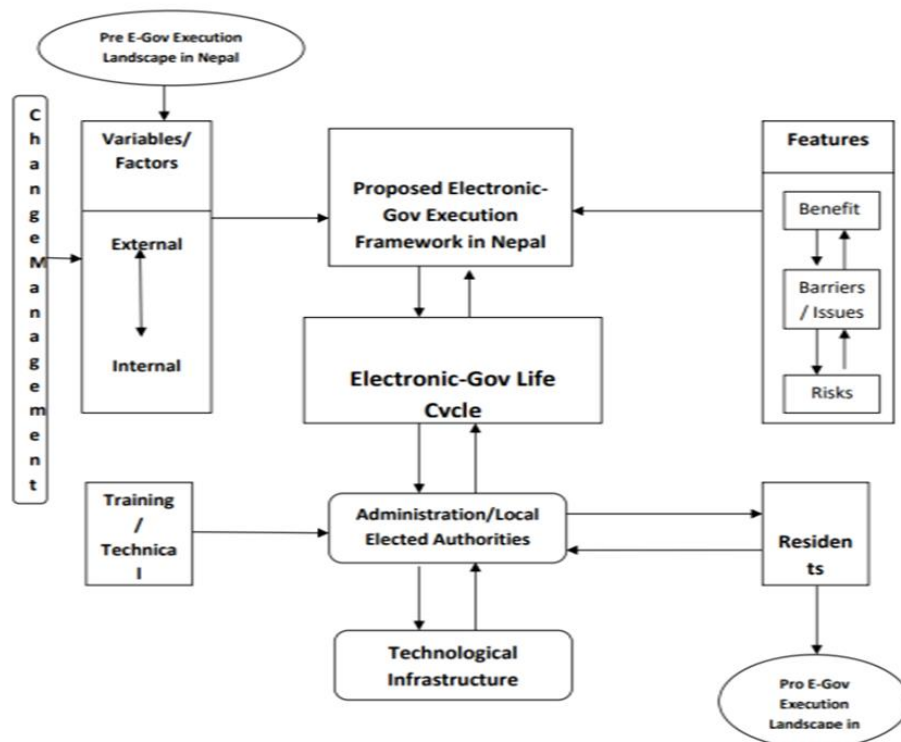
## Vector Art



**Fig. 5.** Internal Factor Visualization

Figures 4 and 5 show the ranking among the internal and external factors analyzed based on data. Based on the above visualization Fig. 6. shows that the proposed framework for the successful implementation of e-

governance in Nepal. This successful implementation can only be incorporated when the government or administrative body will address these key factors and attributes.



**Fig. 6.** Proposed e-Governance Execution Model

According to the study mentioned above, the primary internal and external factors in a nation as well as the actions taken by the government are what decide whether e-governance will be effectively implemented. Using

data from the EGDI, this study contrasts Nepal's perspective to that of other emerging nations and SAARC countries. In this document, the government of Nepal also demonstrates its exceptional efforts. Based on

a study of survey data based on key driving factors, this paper tries to focus on key factors affecting its implementation in Nepal.

## 7. Conclusion

The research mentioned above demonstrates that there will be many difficulties and upgrades required for the application of e-governance. Nepal faces significant obstacles, including geographical, social, governmental, and executive ability problems. Nepal needs to develop the e-participation index, Online Service index (OSI), and Telecommunication facilities to improve the e-governance index. The real underlying causes of Nepal's slow e-governance growth are its political situation, its schooling system, and its altitude. To change the situation, the government must focus on local government organizations by creating a long-lasting strategy that will allow infrastructure to grow throughout Nepal. The study in the previous part indicates that electronic governance is the cornerstone of effective governance. To execute e-government, Nepal must undergo several changes. The Nepalese government must go back to the community level—to municipal governmental bodies—to build the foundation while creating a strong enough strategy to withstand intellectual resistance. The Nepalese administration has embraced efforts for online schooling and learning as well. According to the study previously covered in the data analysis part, implementing electronic governance would present several difficulties and necessitate a substantial increase in all indexes. Descriptive analysis is used to pinpoint the exponentially important internal and external factors that support the application of electronics administration. The generalization under such analysis is done based on dependent as well as independent variables to concentrate on a few major barriers preventing the effective application of electronic government in Nepal. The physical challenges, demographic issues, infrastructure issues, and prospective situations in Nepal are all addressed in this research, and they all contribute to Nepal's total SAARC and UN scores and also presents Intelligent Design and Analysis of E-Governance Conceptual Model for Effective Implementation in Specific Reference to Nepal.

### Author contributions

**Sant Kumar Verma:** Main Author **Vaishali Singh:** Supervisor **Ajay Kumar Bharti:** Supervisor. **Prof. (Dr.) Mohit Gangwar:** Corresponding Author.

### Conflicts of interest

The authors declare no conflicts of interest.

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